Val'ter, A.K.

SOV/58-59-8-17416

Translated from: Referativnyy Zhurnal Fizika, 1959, Nr 8, p 67 (USSR)

AUTHORS: Val'ter, A.K., Klyucharev, A.P., Krivets, G.Ya., Samsonov, V.M.

TITLE: Cross Sections for Be^9 (He^3, p) B^{11*} Reactions at 1.5 Mev Energy

PERIODICAL: Uch. zap. Khar'kovsk un-t, 1958, Vol 98, Tr. fiz. otd. fiz.-matem. fak., Nr 7, pp 159-161

ABSTRACT: In order to determine the cross sections for Be^9 (He^3, p) B^{11*} reactions, which correspond to the excitation levels of 7.3, 5.0 and 4.4 Mev of the B^{11} nucleus, a thin beryllium target was bombarded with He^3 ions, accelerated by means of an electrostatic generator up to 1.5 Mev. The charged particles flying out at an angle of 120°, were registered on photographic plates having an emulsion $200\,\mu$ thick. The quantity of He^3 ions was determined from the intensity of current in the target, which was measured with an integrator. The total cross sections for the three groups of protons were estimated from the resulting magnitudes of the differential cross sections at an angle of 120° and of the angular distributions of these groups of protons, corresponding to the nuclear

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Cross Sections for Be^9 (He^3, p) B^{11*} Reactions at 1.5 Mev Energy

levels of 7.3, 5.0 and 4.4 Mev. The following values(in mbarn) were obtained in the result: (1.4 ± 0.7), (0.5 ± 0.25) and (1.0 ± 0.5) respectively.

V.I. Man'ko

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SOV/58-59-9-19798

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 9, p 55 (USSR)

AUTHORS: Deyneko, A.S., Taranov, A.Ya., Val'ter, A.K.

TITLE: The Determination of Absolute Cross Sections for $B^{10}(p,\gamma)$ and $B^{10}(d,n)$ Reactions

PERIODICAL: Uch. zap. Khar'kovsk. un-t, 1958, Vol 98, Tr. Fiz. otd. fiz.-matem. fak., Vol 7, pp 163 - 170

ABSTRACT: In order to obtain more precise information concerning the levels of the C^{11} nucleus, the authors, through the positron activity of C^{11} nuclei, studied the absolute effective cross section for a $B^{10}(p,\gamma)$ reaction in the 300 to 1,500 KeV proton energy range and for a $B^{10}(d,n)$ reaction in the 100 to 400 KeV deuteron energy range. A special end-window counter served as positron detector. The targets were bombarded with a proton beam from an electrostatic generator, and it proved possible to turn the target faces toward the counter immediately after irradiation. The measured value of the half-life of C^{11} was equal to 20.6 ± 0.1 min. The authors give the energy dependences of the cross sections for $B^{10}(p,\gamma)$ and $B^{10}(d,n)$ reactions. It can be seen from the excitation curve for

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The Determination of Absolute Cross Sections for B^{10}(p,) and B^{10}(d, n) Reactions

SOV/58-59-9-19798

the B^{10}(p, ψ) reaction that extensive resonance exists at E_p = 1.176 MeV. Other re-
sonances were not observed in the investigated range. Accuracy in cross-section
measurement amounts to 20% at energies of 300 to 600 KeV and attains 10% in the region
of resonance. When E_d = 230 KeV, there is a maximum in the cross section for the B^{10}
(d, n) reaction. The absolute value of the effective cross section at resonance amounts
to 2.68 · 10^{-28} cm^2 with an accuracy approaching $\pm$ 10%. On the basis of these data, the
value of the resonance-level energy of C^{11} was computed to be 25.345 MeV.

V.I. Man'ko

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VAL'TER, A.K.

9(314) p. 2-   PHASE I BOOK EXPLOITATION   SOV/2746

Akademiya nauk USSR. Fiziko-tekhnicheskiy institut

Elektrostaticheskiye generatory; sbornik statey (Electrostatic Generators;
    Collection of Articles) Moscow, Atomizdat, 1959. 255 p. 4,100 copies
    printed.

Ed. (Title page): A. K. Val'ter, Member, Academy of Sciences, USSR; Ed. (Inside
    book): Z. D. Andreyenko; Tech. Ed.: N. A. Vlasova.

PURPOSE: This collection of articles may be useful to scientists and engineers
    working with high-voltage electrostatic generators.

COVERAGE: The authors discuss the construction and operation of a number of
    electrostatic generators developed in the USSR and describe methods of gene-
    rating negative hydrogen ions. They discuss the operation of accelerating
    tubes and present methods of stabilizing accelerator voltages. No perso-
    nalities are mentioned. References appear at the end of some articles.

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Electrostatic Generators (Cont.)   SOV/2746

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   The author discusses the operation of a voltage stabilization system
   for a high-current accelerator. The system was developed and tested
   in the laboratory of FTI AN UkrSSR and it may be used in accelerators
   using an electrostatic generator and a multiplier circuit. There are
   no references.

Serbinov, A. N. High-frequency Sources for Electrostatic Generators   77
   The author presents the results of study, conducted by FTI AN UkrSSR
   in 1953-1955, of factors affecting the ring discharge in hydrogen in
   a transverse magnetic field and those affecting the percentage of ions
   in a 10-50-mc frequency range and initial pressure in the discharge
   chamber of 1 through 4×10^{-2} mmHg. He also discusses the construction
   and operation of a high-frequency ion source. There are 3 references:
   2 English and 1 German.

Belyayev, V. Kh., A. K. Val'ter, K. K. Chernyavskiy and S. P. Tsytko.
High-voltage Vertical-Horizontal Electrostatic Generator   90
   The authors discuss the construction and operation of an electro-
   static generator with a cross-shaped steel boiler and two horizon-
   tal tubes and describe the advantages of such a design over horizontal

Electrostatic Generators (Cont.)

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and vertical types of generators. There are 23 references: 8 Soviet, 13 English, 1 French and 1 Danish.

Osetinskiy, G. M. Magnetic Analyzer as an Instrument for Measuring Voltages of an Electrostatic Generator

The author discusses the use of a magnetic analyzer for measuring voltages of an electrostatic generator. He briefly explains the construction of the analyzer and describes the procedure used in measurement. There are 3 references, all English.   99

Osetinskiy, G. M., and I. A. Chepurchenko. Voltage Stabilization of an Electrostatic Generator.

The authors discuss the construction and operation of a voltage stabilization circuit and its elements such as a differential amplifier and a corona triode and describe the method of experimentally determining the degree of stabilization. There are no references.   106

Fogel', Ya. M., A. M. Markus, V. T. Tolok and Ya. I. Shvarts. Ion Sources for Electrostatic Generators in a Compressed Gas

The authors discuss the requirements of ion sources for electrostatic   113

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Electrostatic Generators (Cont.)   SOV/2746

Pivovar, L. I. Accelerating Tube of an Electrostatic Generator   183
     The author briefly discusses factors affecting electric strength of
an accelerating tube and describes processes taking place on tube
walls and intermediate electrodes. He also explains the effect of
residual gases and vapors in a tube on its operation. There are 11
references: 3 Soviet, 7 English and 1 French.

Val'ter, A. K., A. Ya. Taranov, L. I. Pivovar, Ya. M. Fogel', V. Kh.
Belyayev and S. P. Tsytko. 5-Mev Horizontal Overcharging Electrostatic   193
Generator
     The authors discuss the principle of operation and construction of
a PG-5 type electrostatic generator and describe methods of ion
acceleration and overcharging. They also explain the operation of
an ion-beam focusing system and briefly discuss the stabilization
and measurement of generator voltages. There are 4 references: 3
Soviet and 1 English.

Val'ter, A. K., and A. A. Tsygikalo. Experience Acquired in the Design,
Testing and Operation of a 4-Mev Vertical Electrostatic Accelerator De-   200
veloped by FTI AN UkrSSR

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Electrostatic Generators (Cont.)   SOV/2746

The authors discuss the construction and requirements of a 4-Mev
vertical electrostatic accelerator developed by FTI AN UkrSSR and
present the results of a study of insulating materials for the ac-
celerator and the accelerating tube. They also discuss the results of
testing of the accelerator and its components and present current and
voltage characteristics. There are 12 references: 8 Soviet, 3 English
and 1 French.

Malyshev, I. F., F. G. Zheleznikov and G. Ya. Roshal'. Experience Ac-
quired in the Development of Industrial Types of Electrostatic Generators   224
The authors discuss the construction and operation of a EG-2.5 million-
volt electrostatic generator and its components and present the results
of testing. They also briefly describe the operation of a EG-5-1 type
4-5 million volt electrostatic generator developed by OKB in 1956.
There are 9 references: 4 Soviet (including 1 translation) and 5
English.

AVAILABLE: Library of Congress

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                                                        1-6-60

SOV/136-59-5-3/21

AUTHORS: Plaksin, I.N., Corresponding Member of the AN SSSR (AS USSR), Val'ter, A.K., Academician AN Ukr SSR (AS Ukr SSR), and Gol'din, M.L., Engineer.

TITLE: Development of Methods for Measuring Pulp Density (Razvitiye metodov izmereniya plotnosti pul'py)

ABSTRACT: Four main methods exist for pulp-density measurement: pyknometric (Fig 1), float, hydrostatic (Fig 2 shows an advantageous piezometric variant), and radioactive. Hydrostatic methods are in wide and successful use, e.g. at the Balkhashskaya (Balkhash) obogatitel'naya fabrika (beneficiation works). The first three methods have a number of disadvantages (including inapplicability to high-density pulps) absent from radioactive methods (based on the relation between gamma radiation absorption and density). An important development in radioactive methods is the use of scintillation counters, and a great improvement for this type of instrument was reported recently by Reiffel and Humphreys (Ref 20) (Fig 3). Two schemes for a radioactive-type density meter were reported at the conference of radioactive and stable

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SOV/136-59-5-3/21

Development of Methods for Measuring Pulp Density

isotopes and their uses, held in Moscow in April 1957. One of these, (Ref 9) shown in Fig 4, uses two sources, caused to vibrate in opposite phases by electromagnetic vibrators. The other (Ref 10) has one source on a disc rotated by a synchronous motor (Fig 5); it has the advantage of using only one source. Although scintillation counters enable low-activity sources to be used they involve complicated apparatus. Considerable simplification is possible by the use of ionization chambers. A compensating two-chamber method (Ref 11) is shown in Fig 6; this further reduces instrument errors and has the advantage of practically unlimited detector service life. It is the scheme favoured by the authors.

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SOV/136-59-5-3/21

Development of Methods for Measuring Pulp Density

There are 6 figures and 24 references, 15 of which are Soviet and 9 English.

ASSOCIATION: IGD AN SSSR, Fiziko-tekhnicheskiy institut (Physical-technical institute) of the AS Ukr SSR, and Khar'kovskiy zavod KIP (KIP works in Khar'kov)

Card 3/3

VAL'TER, A.K.; ZALYUBOVSKIY, I.I. [Zaliubovs'kyi, I.I.]; KLYUCHAREV, A.P. [Kliuchariev, O.P.]; LUTSIK, V.P. [Lutsyk, V.P.]

Energy levels of a Zn^{65} nucleus [with summary in English]. Ukr. fiz. zhur. 4 no.1:46-51 Ja-F '59.   (MIRA 12:6)

1.Fiziko-tekhnicheskiy institut AN USSR i Khar'kovskiy gosudarstvennyy universitet.

(Zinc—Isotopes) (Nuclear shell theory)

VAL'TER, A.K.; ZALYUBOVSKIY, I.I. [Zaliubovs'kyi, I.I.]; KRIVETS, G.Ye.
[Kryvets', H.IU.]; LUTSIK, V.P. [Lutsyk, V.P.]

Isomeric states of odd-odd nuclei from the viewpoint of a
collective model. Ukr.fiz.zhur. 4 no.6:689-696 N-D '59.
(MIRA 14:10)

1. Fiziko-tekhnicheskiy institut AN USSR.
           (Isomerism)   (Nuclear models)

VAL'TER, A.K.; ZALYUBOVSKIY, I.I. [Zaliubovs'kyi, I.I.]; LUTSIK, V.P.
[Lutsyk, V.P.]

Applying a generalized nuclear model for describing the ground
states of nuclei of medium atomic weight. Ukr.fiz.zhur. 4
no.6:697-707 N-D '59.   (MIRA 14:10)

1. Fiziko-tekhnicheskiy institut AN USSR i Khar'kovskiy
gosudarstvennyy universitet.
                    (Nuclear models)

21(7)
AUTHORS:

Val'ter, A. K., Zalyubovskiy, I. I., Klyucharev, A. P., Krivets, G. Ye., Lutsik, V. A.

TITLE: On the Excitation States of the Nuclei Ga^{67} and Ga^{68}
             (O vozbuzhdennykh sostoyaniyakh yader Ga^{67} i Ga^{68})

ABSTRACT: For the study of the lower energy levels Gd^{67} and Gd^{68} the
             authors investigated the γ radiation which occurs in the
             reactions $Zn^{66}(p,\gamma)$ Ga^{67}, $Zn^{67}(p,n\gamma)Ga^{67}$ and $Zn^{67}(p,\gamma)Ga^{68}$.
             The zinc targets used were enriched with Zn^{66} and Zn^{67}. The
             γ lines determined during proton irradiation of the targets
             are listed (representation of the spectra in figures 1 and 2).
             The lines 170, 358, - 850, and 510 kev are caused by re-
             actions of the types $Zn^{66}(p,\gamma)Ga^{67}$, $Zn^{67}(p,n\gamma)Ga^{67}$. The $(p,n\gamma)$
             reaction corresponds to the transition from the secondary
             excitation state into the basic state; it is a threshold re-

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On the Excitation States of the Nuclei Ga^{67} and Ga^{68} SOV/48-23-2-12/20

action. According to these data, a scheme of the lower energy levels of Ga^{67} is given in figure 4. Because of the difficulties of investigating reaction $Zn^{67}(p,\gamma)Ga^{68}$ the authors measured only the upper limit of the γ spectrum in the Ga^{68} decay. It is found at γ quantum energies of 2.05 ± 0.1 Mev. There are 4 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR, Khar'kovskiy gos. universitet im. A. M. Gor'kogo (Physico-technical Institute of the Academy of Sciences, UkrSSR, Khar'kov State University imeni A. M. Gor'kiy)

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21(7)   SOV/48-23-2-13/20
AUTHORS: Val'ter, A. K., Gonchar, V. Yu., L'vov, A. N., Tsytko, S. P.

TITLE: Investigation of γ Rays Caused by Proton Bombardment of an
               Ne^{20}-containing Target (Issledovaniye γ-luchey, voznikayushchikh
               pri bombardirovke protonami misheni, soderzhashchey Ne^{20})

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,
               Vol 23, Nr 2, pp 228-234 (USSR)

ABSTRACT: In a short introduction a decay scheme of the lower levels of
               the nuclei Ne^{21} and Na^{21} is given according to data contained
               in references 1-3 and 4-6, 7. In the present paper the char-
               acteristics of the level 3.57 Mev in the Na^{21} nucleus were
               investigated in detail in the reaction $Ne^{20}(p,\gamma)Na^{21}$. The
               authors measured the radiation yield in dependence on the
               energy of the bombarding particles (Fig 1).10 resonances were
               found. The energies and experimental width of these resonances
               are given in table 1. Furthermore, the authors studied the
               β activity of the same target with energies corresponding to
               the resonance, as well as the γ spectrum of all 10 resonance
               energies. All measurement results are listed in table 1. It ·
Card 1/3   follows from the evaluation of all data obtained that the

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Investigation of γ Rays Caused by Proton Bombardment of an

Ne^{20}-containing Target

resonance energy with the proton energy 1175 kev corresponds to the reaction $Ne^{20}(p,\gamma)Na^{21}$. The energy of the corresponding γ-radiation amounts to 3.60 Mev. According to the calculation of mass defect with the proton energy 1175 kev the same value 3.58 Mev is determined. Accurate investigations have shown that this 3.60Mev γ line corresponds to the transition into the ground state. The angular distribution of dipole and quadrupole γ transitions was calculated and compared to values obtained by experiments. In addition, spin and parity of the 3.58 Mev level of Na^{21} were determined to be $5/2^+$. There occurs a dipole transition $5/2^+ \longrightarrow 3/2^+$ (Table 5). The authors thank M. I. Guseva for production of the Ne^{20} target and Ye. V. Inopin for discussion of the results obtained. There are 4 figures, 5 tables, and 17 references, 4 of which are Soviet.

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Investigation of γ Rays Caused by Proton Bombardment of an

Ne^{20}-containing Target

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR
(Physicotechnical Institute of the Academy of Sciences,   UkrSSR)

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24(5),21(7)
AUTHORS:

SOV/48-23-7-11/31

Val'ter, A. K., Gonchar, V. Yu., L'vov, A. N., Tsytko, S. P.

TITLE:

The Investigation of Low-lying Levels of the Isotope Cl^{33} by Means of the Reaction $S^{32}(p,\gamma)Cl^{33}$

(Issledovaniye nizkolezhashchikh urovney Cl^{33} pri pomoshchi reaktsii $S^{32}(p,\gamma)Cl^{33}$)

ABSTRACT: The introduction indicates some papers on the lower levels of the Cl^{33}-nuclei, pointing out the paper by Meyerhof and Lindstrom (Ref 3) in which the multiple β-decay on the 2.9 Mev-level is attributed to a positive parity. To check this assumption, the authors carried out the experiments described in this paper. The electrostatic precision generator of 4 Mev of the FTI AS UkrSSR was used for this purpose. In the measurement of the γ-yield, resonances were found at 583 and 590 kev, as well as a half-life of 2.3 sec, which agrees with the known data. Further, the scheme of γ-transitions shown in figure 2 was established by the authors by means of the

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The Investigation of Low-lying Levels of the
Isotope Cl^{33} by Means of the Reaction $S^{32}(p,\gamma)Cl^{33}$

γ-spectrum. The angular distribution of the γ-rays in the
reaction $S^{32}(p,\gamma)Cl^{33}$ was measured, and the results are shown
in table 1 and figures 3 and 4. From these results, conclusions
concerning the spin and the character of transitions are made,
and it is shown that the spin and the parity of the 2.850 Mev-
level is equal to $5/2^{+}$. With the level scheme shown in figure 2,
conclusions are made concerning the spin, parity and energy of
the next level. Finally, the authors thank M. I. Gusev for the
preparation of the S^{32}-target, and Ye. V. Inopin for his
interest in the work, Yu. P. Antuf'yev and Ye. G. Kopanets for
the execution of the measurements, as well as A. A. Tsygikalo and
Yu. A. Kharchenko who secured the work at the generator. There
are 4 figures, 1 table, and 9 references, 4 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physico-
technical Institute of the Academy of Sciences, UkrSSR)

Card 2/2

24(5),21(7)

AUTHORS: Val'ter, A. K., Deyneko, A. S., Malakhov, I. Ya., Sorokin, P. V., Taranov, A. Ya.

TITLE: The Elastic Scattering and the Radiation Capture of Protons by N^{14}-Nuclei (Uprogoye rasseyaniye i radiatsionnyy zakhvat protonov yadrami N^{14})

ABSTRACT: It is pointed out in the introduction that the investigations of the elastic scattering of the protons by N^{14}-nuclei were carried out by studying the levels of the O^{15}-nuclei, and a number of papers (Refs 1-7) are pointed out in this connection. In another paper (Ref 8), the reaction $N^{14}(p, \gamma)$ was investigated, and the results of these papers are shown in diagrams (Figs 2 and 3). In the present paper, the elastic scattering cross section is investigated in the energy range of 1.7 - 3.5 Mev. The measuring instrument used in these investigations is shown in figure 1, and the proton beam was generated by the electrostatic generator

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The Elastic Scattering
and the Radiation Capture of Protons by N^{14}-Nuclei

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of the FTI AS UkrSSR. The elastic scattering cross section of
the protons on N^{14}-nuclei was measured under the angles 54, 90,
141 and 154°, and the results are shown in diagrams (Figs 2-6).
The curves $\sigma(E_p)$ show six narrow resonances and one wide
resonance at 2.4 Mev. In order to determine the width of the
levels, the value of the resonance energy was accurately
determined, it was investigated how much the proton beam is
monoenergetic, and the reaction $N^{14}(p,\gamma)$ was studied. An experi-
mental width of resonance of 7.5 kev was measured. The relative
γ-yield was investigated in the resonance range of 1.8, 2.35
and 2.48 Mev, and the results are shown in 2 diagrams (Figs 7
and 8). By comparing the widths of the resonances thus obtained
with the corresponding values for the resonance in the elastic
scattering cross section, it becomes clear that the energetic
scattering of the protons does practically not depend on the
energy, and that the latter amounts to about ±8 kev. This
determines the widths of the levels in the elastic scattering
cross section at 17 and 40 kev, respectively. The levels of

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The Elastic Scattering   SOV/48-23-7-12/31
and the Radiation Capture of Protons by N^{14}-Nuclei

the O^{15}-nuclei are compiled in table 2, and it is ascertained
that the results obtained are in good agreement with those
obtained by other authors. The authors thank M. I. Gusev for
the preparation of the N^{14}-target by the electromagnetic
separator, and A. A. Tsygikalo and Yu. A. Kharchenko and the
staff for the operation of the electrostatic generator. There
are 8 figures, 2 tables, and 10 references, 1 of which is Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physico-
technical Institute of the Academy of Sciences, UkrSSR)

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24(5),21(7)

SOV/48-23-7-13/31

AUTHORS: Val'ter, A. K., Malakhov, I. Ya., Sorokin, P. V., Taranov, A. Ya.

TITLE: Elastic Scattering of the Protons by Ar^{40}-Nuclei

(Uprogoye rasseyaniye protonov yadrami Ar^{40})

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,
              Vol 23, Nr 7, pp 846-848   (USSR)

ABSTRACT: In the introduction, it is ascertained that the investigation
              of the elastic scattering of the protons by Ar^{40}-nuclei is
              carried out by studying the levels of the K^{41}-nuclei. A non-
              Russian paper is indicated (Ref 2) in which weak resonances
              were determined at the energies of 1.9 and 2.48 Mev; the values
              put forward are, however, considered inaccurate to obtain a
              survey of the spins and parities of the respective levels. The
              experiments described in the present paper were carried out
              with the same instrument as the experiments described in the
              previous paper of this issue. The elastic scattering cross
              section was recorded under the angles of 90, 125 and $150°$ in an
Card 1/2   energy range of 1.7 to 2.7 Mev. As the diagrams of

Elastic Scattering of the Protons by Ar^{40}-Nuclei   SOV/48-23-7-13/31

figures 1, 2 and 3 show, two weak resonances can be observed in the elastic scattering cross section at E_p = 1.86 and 2.45 Mev, and further a number of resonances at energies over 2.5 Mev. A comparison of the experimental data with the data computed, as well as a determination of the widths of the levels, are not possible. It is further ascertained that the reaction $Ar^{40}(p,n)K^{40}$ is only realized by protons with the orbital momentum l = 3 or l = 5. Finally, the distance of the levels in the K^{41}-nuclei is evaluated, and is indicated with 20 kev at an excitation energy of 10 Mev. There are 3 figures and 6 references, 2 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR
               (Physico-technical Institute of the Academy of Sciences, UkrSSR)

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24(5),21(7)   SOV/48-23-7-14/31

AUTHORS: Val'ter, A. K., Zalyubovskiy, I. I., Klyucharev, V. A.,
             Lutsik, V. A.

TITLE: On the Excited States of Ga^{67} and Ga^{68}
             (O vozbuzhdennykh sostoyaniyakh Ga^{67} i Ga^{68})

ABSTRACT: In the present paper, the authors investigated the γ-rays
             originating in the following reactions: $Zn^{66}(p,\gamma)Ga^{67}$,
             $Zn^{67}(p,n\gamma)Ga^{67}$, and $Zn^{67}(p,\gamma)Ga^{68}$. They used for this
             purpose a scintillation γ-spectrometer. Also the decay of the
             isotope Ga^{67} was investigated; the protons were accelerated
             by means of the electrostatic generator of the FTI AS UkrSSR.
             In table 1 and in three diagrams (Figs 1, 2 and 3), the
             measured energies of the lines observed are represented and
             compared with the results by other authors. It was found that in
             the range of the γ-spectrum of 172-188 kev of Zn^{67} a shifting

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of the γ-peaks of the curves is caused by the irradiation with protons. This shifting is explained as follows: if the protons have an energy < 1.96 Mev, they do not excite the 172 kev-state of the isotope Ga^{67}, but a γ-radiation with an energy of 188 kev is observed caused by the reaction $Zn^{67}(p,\gamma) Ga^{68}$, and one with 182 kev caused by the reaction $Zn^{67}(p,p'\gamma)$. At an increase in the proton energy, the 172 kev-γ-radiation of Ga^{67} arises. Subsequently, the γ-radiation in the range of 120-240 kev at a proton energy > 2.1 Mev is attributed to the reaction $Zn^{67}(p,n)Ga^{67}$. The γ-spectrum of this interaction is complicated, and by a comparison with the reaction $Co^{59}(p,n)Ni^{59}$, which has no complicated structure in the range of the γ-spectrum of 120-240 kev, the half-width of the 163 kev-γ-line is computed, and it is concluded that the shifting of the peaks must not be observable. In investigating the reaction $Zn^{68}(p,n)Ga^{68}$, the excited state of Ga^{68} with the energy of

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342 kev had been detected before. The authors then make some deliberations on the levels of some reactions; a table of relative intensities of the γ-quanta is put forward for the decay $Ga^{67} \longrightarrow Zn^{67}$, and a level scheme of the isotopes Ga^{67} and Ga^{68} is established. There are 6 figures, 3 tables, and 8 references, 2 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physico-technical Institute of the Academy of Sciences, UkrSSR) Khar'kovskiy gos. universitet im. A. M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

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PHASE I BOOK EXPLOITATION   SOV/4768

Val'ter, Anton Karlovich

Vvedeniye v fiziku elementarnykh chastits (Introduction to the Physics of Elementary Particles) Khar'kov, Izd-vo Khar'kovskogo gos. univ-ta im. A.M. Gor'kogo, 1960. 261 p. Errata slip inserted. 10,000 copies printed.

Resp. Ed.: A.P. Klyucharev; Ed.: D.A. Vaynberg; Tech. Ed.: A.S. Trofimenko.

PURPOSE: This publication is intended as a textbook for students in the divisions of physics and mathematics in universities. It can also be used by teachers of physics in schools of secondary and higher education.

COVERAGE: This book presents basic facts established during the last two decades concerning the physics of elementary particles, and explains the physical laws governing elementary process occurring at very high energies. No personalities are mentioned. There are 10 references [in the Foreword]: 6 Russian, 3 English, and 1 French.

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S/185/60/005/002/015/022
D274/D304

AUTHORS: Val'ter, A.K., Zalyubovs'kyy, I.I., Klyucharyev, O.P., Pasichnyk, M.V., Pucherov, M.M. and Chyrko, B.I.

TITLE: Elastic scattering of protons with an energy of 6.8 MeV by isotopes of chromium, nickel and copper

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 5, no. 2, 1960, 270-272

TEXT: The angular distribution of elastically scattered protons by the isotopes: Cr^{52}, Cr^{53}, Ni^{58}, Ni^{60}, Ni^{62}, Cu^{63}, Cu^{65} is investigated. Up to now it has not been easy to formulate a theoretical interpretation of the effects related to proton scattering; hence, the importance of gathering and systemizing relevant data. The protons with energy 6.8 ± 0.1 MeV were obtained on the cyclotron of the Physics Institute of the UkrSSR. The proton scattering was detected by a scintillation spectrometer. The measurements were conducted from 20° to 160°, at angle intervals of 5°. The investi-

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Elastic scattering of protons...   S/185/60/005/002/015/022
                                      D274/D304

gated mixtures contained at least 98% of the isotope, with the exception of Cr^{53} whose proportion was 95%; they were in the form of thin $(3 - 4\mu)$ plates. The results of the investigations are given in 2 figures, where the angular distribution is plotted as the ratio of an experimental differential cross-section to the Rutherford cross-section. The results show a noticeable shift in the position of the maxima and minima of the angular distributions. It is noted that such a shift is observed for small differences in the mass number of the scatterer nucleus. Thus the distribution curve for Cu^{65} is shifted by 5° with respect to that of Cu^{63}. Such a result is in good agreement with data on proton scattering with 19.6 MeV energy. The form of the distribution curves for both Cu isotopes is entirely identical. The results for Cr isotopes are different. The differential cross-section in the region of large angles is considerably greater for Cr^{52} than for Cr^{53}. It is noted that it would be even much greater if the energy separation in the experiment would be higher. In the case of Ni isotopes, the distribution curve for Ni^{62} differs greatly from those for Ni^{60}. For Ni^{62} the cross section decreases considerably with increasing angles larger

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Elastic scattering of protons...   S/185/60/005/002/015/022
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than 120°. The angular distribution for Ni^{58} and Ni^{60} is in the main similar to that for natural isotope mixtures; this is not un-expected. The observed considerable difference in scattering by Ni isotopes, which may be related to various degree of absorption, is somewhat unexpected, though it does not contradict the results obtained by A.P. Klyucharev and N.Ya. Rutkevich (Ref. 3: ZhETF, 1, 1960). There are 2 figures and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publica-tion reads as follows: M.K. Brussel, I.H. Williams, Phys. Rev., 114, 525, 1959.

ASSOCIATION: Instytut fizyky AN USSR (Physics Institute AS Ukr-
                SSR) Fizyko-tekhnichnyy instytut AN USSR (Physico-
                technical Institute AS UkrSSR)

SUBMITTED: November 19, 1959

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21.7000

SOV/89-8-3-10/32

AUTHORS: Val'ter, A. K., Gol'din, M. L.

TITLE: Humidity Determination of Free-Flowing Materials by
                Neutron Slowing-Down Method. Letter to the Editor

PERIODICAL: Atomnaya energiya, 1960, Vol 8, Nr 3, pp 248-250
                (USSR)

ABSTRACT: Gravimetric, chemical, or electric methods can be used
                in humidity determination of free-flowing materials, but
                they are neither fast nor reliable. Putman noted during
                the 1955 Geneva Conference for Peaceful Uses of Atomic
                Energy that if neutron counting is used for humidity
                determination, the results should be independent from
                the presence of elements with $Z > 5$ and from density
                and mass of the absorber (except in the case of very
                strong neutron absorbers). The authors designed experi-
                ments using molding earth and measured the variable slow
Card 1/3   neutron flux by means of a scintillating detector. A

Humidity Determination of Free-Flowing   78325
Materials by Neutron Slowing-Down   SOV/89-8-3-10/32
Method.   Letter to the Editor

1-curie Po^{210} polonium-beryllium source supplied $2.5 \cdot 10^6$
neutrons/sec. Tests were performed by A. P. Krivchikov
and N. V. Pavlenko. The earth was between two iron
cylinders, and it was found more convenient to have
the source and the detector completely surrounded by
the material than to put the earth between them. For
a fixed humidity the counting rate increased until
the thickness of the earth reached 10 cm, and stayed
afterwards constant, confirming conclusions of
Putman. The counting rate of completely dry earth
was equal to that of the background count of the empty
device. The humid samples were prepared with an
accuracy of better than 0.5 weight %. The results of
three series of measurements are in Table A. Using
interpolation formulas, the authors established an
empirical relationship of the form:

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$$I = 1225 + 4W + 1210W^2 - 1.53W^3 + 01W^4$$

Humidity Determination of Free-Flowing   78325
Materials by Neutron Slowing-Down   SOV/89-8-3-10/32
Method. Letter to the Editor

Table A. Counting rate I versus humidity W.

W. weight %	0	3	6	9	12
I_1, imp/sec	1211±10	1316±6	1468±27	1821±33	2445±100
I_2, "	1202±12	1312±9	1529±27	1751±20	2425±70
I_3, "	1223±10	1307±7	1457±36	1784±34	2487±119

Cand. Tech. Sc. T. V. Timofeyeva supplied advice.
There are 1 figure; 1 table; and 3 references, 2 Soviet,
and 1 a paper of unknown nationality, read at the
international Conference for Peaceful Uses of Atomic
Energy, Geneva, 1955.

SUBMITTED: May 25, 1959

Card 3/3

82736

S/089/60/009/002/007/015
B006/B056

21. 5200

AUTHORS: Val'ter, A. K., Gol'din, M. L., Slavin, V. I.

TITLE: Approximate Calculation of the Mean Energy of Electrons
              Knocked out by Gamma Rays in an Ionization Chamber

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 2, pp. 135-136

TEXT: An ionization chamber is better suited than a phosphor for various
technical purposes such as measuring the thickness and density of materials.
The low efficiency of ionization chambers for gamma radiation may be in-
creased by various means. Mostly, this is done by coating the inner surface
of the chamber with lead and by using multi-layer high-voltage collector
electrodes. As an exact calculation of the ionization current meets with
considerable difficulties, an approximation method is suggested here, which
is based upon the knowledge of the mean energy of the electrons knocked
out by gamma quanta. For this purpose, the authors used published theoreti-
cal and experimental data concerning the gamma radiation of Co^{60} and Cs^{137}.
The geometry of the experiment theoretically dealt with in this paper is
illustrated by a schematical drawing. The values obtained show that the

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Approximate Calculation of the Mean Energy of   S/089/60/009/002/007/015
Electrons Knocked out by Gamma Rays in an   B006/B056
Ionization Chamber

method is suited for estimating ionization currents.

	Experimental	Calculated	Difference
Cs^{137}	0.418 Mev	0.349 Mev	16.5%
Co^{60}	0.702 Mev	0.798 Mev	13.7%

There are 1 figure, 1 table, and 9 references: 8 Soviet and 1 US.

SUBMITTED: February 26, 1960

Card 2/2

VAL'TER, A.K., akademik (Khar'kov)

Physics of high energy. Nauka i zhyttia 10 no.1:14-18
(MIRA 13:6)
Ja '60.

1. AN USSR.   (Nuclear physics)

05592

S/048/60/024/007/026/032/XX
B019/B056

24.6100
AUTHORS:

Antuf'yev, Yu. P.; Val'ter, A. K., Gonchar, V. Yu., Kopanets, Ye. G., L'vov, A. N., and Tsytko, S. P.

TITLE: An Investigation of the Levels of the Cl^{35} Nucleus

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 7, pp. 877-883

TEXT: This paper was read at the 10th All-Union Conference on Nuclear Spectroscopy, which took place from January 19 to January 27, 1960 at Moscow. The authord studied the levels and the quantum characteristics of the Cl^{35}-nucleus by means of the reaction $S^{34}(p,\gamma)Cl^{35}$. The excitation function, the spectrum, and the angular distribution of the γ-rays were measured. The investigations of the S^{34} target were carried out by means of a monochromatic proton beam accelerated to 4 Mev in the electrostatic generator of the FTI AS UkrSSR. The γ-rays were recorded by means of a CsI(Tl) crystal. When studying the excitation function, γ-quanta with $E_\gamma > 1.5$ Mev were recorded. In the Table, the proton energies are given,

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An Investigation of the Levels of the Cl^{35} S/048/60/024/007/026/032/XX
Nucleus   B019/B056

at which γ-resonance was observed; also given are the relative intensities
of the resonance peaks and the energies of the excited Cl^{35} levels. For
the purpose of studying the spectra and the angular distributions of the
γ-rays, the authors used a monocrystal scintillation spectrometer. On the
basis of the data obtained, the authors suggest the Cl^{35} transition scheme
shown in Fig. 5. Resonances in the case of four proton energies (E_p) are
discussed in detail. The resonance at E_p = 848 kev corresponds to the
7.196 Mev Cl^{35} level, for which a γ-transition to the 1.22 Mev level occurs
with a probability of 95%, and a γ-transition to the ground state of Cl^{35}
occurs with a probability of not more than 5%. For the 7.196 Mev level,
$1/2^+$ is presumed. The resonance at E_p = 890 kev corresponds to the

7.236 Mev of the level of the Cl^{35}. The γ-spectrum indicates a transition
from this level to the ground state. Also transitions to the 1.22-Mev
level are possible. For the 7.236-Mev level, $5/2^+$ is assumed. Resonance at
E_p = 929 kev corresponds to the 7.274-Mev level, from which transitions to
the ground state (70%) and to the 1.22-Mev level (30%) occur. For this
level, a spin of $1/2$ is assumed, but here a more exact investigation is
necessary. The authors carried out preparatory measurements of the spectra

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An Investigation of the Levels of the Cl^{35} S/048/60/024/007/026/032/XX
Nucleus   B019/B056

and of angular asymmetry of the γ-rays for the resonances at $E_p = 881$, 1024, and 1214 kev. By a further investigation of the angular distribution and correlation of the γ-cascade transitions, the problems arising in this connection are expected to be cleared. The authors thank M. I. Guseva for producing the S^{34} target, and A. A. Tsygikalo and Yu. A. Kharchenko for work carried out on the accelerator. There are 5 figures, 1 table, and 8 references: 4 Soviet and 4 US.

ASSOCIATION: Khar'kovskiy fiziko-tekhnicheskiy institut Akademii nauk USSR (Khar'kov Institute of Physics and Technology of the Academy of Sciences, UkrSSR)

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65593

S/048/60/024/007/027/032/XX
B019/B056

24.6600

AUTHORS: Valter, A. K., Deyneko, A. S., Sorokin, P. V., and
               Taranov, A. Ya.

TITLE: The Elastic Scattering of Protons by Ne^{20} Nuclei

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
               Vol. 24, No. 7, pp. 884-886

TEXT: This paper was read at the 10th All-Union Conference on Nuclear
Spectroscopy, which took place from January 19 to January 27, 1960 at
Moscow. As a target, gaseous neon (90.5% Ne^{20}) at a pressure of 5 torr was
used in the measurements described. The cross section was measured at
angles of 55, 90, 125, 141, and 151° in the center-of-mass system. The
proton energy was varied in the range of from 1.6 - 3.4 Mev. The hetero-
geneity of the radiation was ±8 kev. From the results shown in Figs. 1 and
2, five well-marked resonances may be seen. In the first column of the
Table, the proton energies, in the second column the energies of the cor-
responding Na^{21} levels, in the third the level widths according to data
by Heaberli (Ref. 2) and according to data obtained by the authors are

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The Elastic Scattering of Protons by Ne^{20} S/048/60/024/007/027/032/XX
Nuclei   B019/B056

given. Furthermore, the spins and parities are given. The latter were obtained by a phase shift analysis. As shown by an investigation of the polarization of the protons scattered by Ne^{20} nuclei at an angle of 90°, the polarization in the energy range of from 1 - 1.8 Mev attains 70% (Fig. 3). There are 3 figures, 1 table, and 7 references: 3 Soviet, 3 US, and 1 Dutch.

Резонансные энергии протонов и характеристики уровней Na^{21}

E_p, MeV	Энергия уровня пара Na^{21}, MeV	Ширина уровня Г, keV		Спин и четность	$\dfrac{\Gamma_p}{\Gamma}$	Приведенная ширина γ², MeV см
		по нашим данным	по данным [2]			
1,81	4,18	121	180	3/2⁻		1,4·10⁻¹³
1,96	4,32	17	6	5/2⁺	0,25	0,8·10⁻¹³
2,15	4,50	27	17	3/2⁺	0,84	0,9·10⁻¹³
2,69	5,02					
3,18	5,48	80	110	1/2⁺		0,2·10⁻¹³

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S/048/60/024/007/008/011
B019/B060

AUTHORS: Val'ter, A. K., Antuf'yev, Yu. P., Gonchar, V. Yu.,
             L'vov, A. N., Kopanets, Ye. G., Tsytko, S. P.

TITLE: A Study of the K^{41} Levels With the Aid of the $Ar^{40}(p,\gamma)K^{41}$
             Reaction

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
             Vol. 24, No. 7, pp. 891-894

TEXT: This is the reproduction of a lecture delivered at the 10th All-
Union Conference on Nuclear Spectroscopy held in Moscow from January 19
to 27, 1960. The investigations described were carried out by using an
electrostatic precision generator serving for the proton acceleration. The
thin Ar^{40} target was prepared in an electromagnetic separator. The excita-
tion function of the reaction was measured by a scintillation counter
provided with a CsI(Tl) crystal, a proton current integrator serving for
measuring the proton beam hitting the target. Fig. 1 shows the excitation
function of the reaction under investigation in the proton energy range

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A Study of the K^{41} Levels With the Aid of the   S/048/60/024/007/008/011
$Ar^{40}(p,\gamma)K^{41}$ Reaction   B019/B060

of 1085 - 1130 kev. Resonances were identified at 1092, 1107.5, 1114.5, and
1125 kev proton energies. The most intensive resonances occurred at 1092
kev and 1107.5 kev and their gamma spectrum was investigated. Fig. 2 is
a graph depicting the soft and the hard part of the gamma spectrum of
resonance at 1107.5 kev. These spectra are thoroughly discussed and the
authors suggest a decay scheme of the excited K^{41} levels (Fig. 3), which
also indicates the spins for some levels. The authors thank M. I. Guseva
for having prepared the targets. There are 3 figures and 12 references:
6 Soviet, 5 US, and 1 Canadian.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR
                (Institute of Physics and Technology of the Academy of
                Sciences UkrSSR)

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83575

S/056/60/038/005/008/050
B006/B070

24.6510

AUTHORS: Val'ter, A. K., Zalyubovskiy, I. I., Klyucharev, A. P.,
            Pasechnik, M. V., Pucherov, N. N., Chirko, V. I.

TITLE: Angular Distributions of 6.8-Mev Protons Elastically
            Scattered by Chromium-, Nickel-, and Copper Isotopes

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
            Vol. 38, No. 5, pp. 1419-1423

TEXT: The authors have determined the angular distribution of 6.8-Mev
protons elastically scattered by $Cr^{52,53}$, $Ni^{58,60,62}$, and $Cu^{63,65}$.
(6.8$\pm$0.1)-Mev protons were obtained from the cyclotron of the Institut
fiziki AN USSR (Institute of Physics of the AS UkrSSR). The scattered
protons were recorded by a scintillation spectrometer which consisted
of a CsI(Tl) crystal, a photomultiplier of the type ФЭУ-29 (FEU-29),
and a 50-channel pulse-height analyzer of the type AИMA-1 (AIMA-1).
Measurements were made between 20° and 160° every 5°, the angles being
determined with an accuracy of 0.3^{o}. Depending on the thickness of the
target, the energy resolution of the scintillation spectrometer was 4-6%.

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Angular Distributions of 6.8-Mev Protons
Elastically Scattered by Chromium-, Nickel-,
and Copper Isotopes

S/056/60/038/005/008/050
B006/B070

The energy spectrum of the scattered protons was taken for each angle of
measurement. The differential scattering cross section was determined in
the center-of-mass system. Free films of 3 - 5 μ thickness, enriched in the
isotope to be studied to 93-98% served as targets. The compositions of the
targets are given in a table. For a majority of the investigated nuclei, the
energy resolution of the scintillation spectrometer was adequate to separate
the group of inelastically scattered protons from that of elastically
scattered protons. One of these energy spectra (Cr^{52}) is shown in Fig. 1.
In this spectrum taken at 90° the first level (1.44 Mev) is distinctly
marked; this group of protons can be well separated from the elastically
scattered protons. The groups of protons related to the excitation of
the lowest levels, 0.54 and 1.01 Mev, of the Cr^{53} nucleus can make a sig-
nificant contribution to the elastic scattering, particularly for large
scattering angles, because the high-energy resolution is inadequate. The
angular distribution of elastically scattered protons for the two chromium
isotopes and E_p = 6.8 Mev is shown in Fig. 2. The first excited states of
$Ni^{58,60,62}$ are at 1.44, 1.33, and 1.17 Mev, respectively. The proton groups
corresponding to these levels can be easily separated from the group of

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Angular Distributions of 6.8-Mev Protons
Elastically Scattered by Chromium-, Nickel-,
and Copper Isotopes

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elastically scattered protons. The angular distribution curves for Ni^{58} and Ni^{60} show analogous behavior, the curve for protons scattered from Ni^{62} deviates considerably from the former two (Fig. 3). The angular distributions and cross sections for the two copper isotopes show again analogous behavior; only, as for chromium, the curve for the heavier isotope is slightly (5°) shifted toward smaller angles. It is found that in order to obtain good agreement between theory and experiment, one must take into account, in the optical model, not only the spin-orbit interaction of the incident nucleon but also the effect of the shell structure of the nucleus on scattering. There are 4 figures, 1 table, and 12 references: 5 Soviet, 6 US, and 1 Japanese.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
               (Institute of Physics and Technology of the Academy of
               Sciences Ukrainskaya SSR)

SUBMITTED: November 17, 1959

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84425

S/056/60/039/004/043/048
B006/B056

24.6200

AUTHORS: Val'ter, A. K., Zalyubovskiy, I. I., Klyucharev, A. P.,
             Lutsik, V. A.

TITLE: A New Method of Identifying γ-Radiations in the Reactions /9
             (p,p'γ), (p,γ), and (p,nγ)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
             Vol. 39, No. 4(10), pp. 1159 - 1161

TEXT: The investigation of nuclear levels by the bombardment of targets
with low-energy protons is rendered difficult by not being able without
any difficulty to decide whether the gamma radiation observed is due to a
(p,γ), a (p,p'γ), or a (p,nγ) reaction. In the present "Letter to the
Editor", the writers first discuss the factors influencing the relative
frequency of the individual reactions. Thus, if this is possible from the
viewpoint of energy, a gamma radiation accompanied by nucleons is more
probable than a pure one, and the existence of the potential barrier, in
turn, renders proton emission difficult, so that the reaction (p,nγ) is
predominant; besides, the neutron emission probability near the

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84425

A New Method of Identifying γ-Radiations in   S/056/60/039/004/043/048
the Reactions (p,p'γ), (p,γ), and (p,nγ)   B006/B056

(p,n) threshold grows quickly with the energy of the emitted neutrons, so
that the (p,p'γ) and (p,γ) reaction yields in certain proton energy ranges
above the (p,n) threshold decrease quickly. By an investigation of the
gamma yields of each of the observed lines as a function of proton energy
in the (p,n) threshold region, it is possible to separate the gamma
radiations resulting from the reactions (p,p'γ) and (p,γ) of the investi-
gated isotope from those of the admixtures, because it is improbable that
the (p,n) thresholds are near to one another. An increase of proton
energy beyond the (p,n) threshold causes an excitation of higher levels of
the nucleus in the (p,nγ) reaction, and each time after a level excitation
threshold is exceeded, a decrease of the gamma-radiation intensity of the
reactions (p,p'γ) and (p,γ) may be observed. The (p,n) thresholds are well
known for all stable isotopes, and deviate only little from one another
for isotopes of the same element. In order to exclude changes in the gamma
yield caused due to various proton capture probabilities on the individual
levels of the compound nuclei, the target thickness must be chosen in a
particular manner - for medium nuclei about 1μ. For the purpose of
investigating nuclear levels by means of (p,nγ) reactions, one proceeds in
the opposite order by investigating the dependence of the gamma yield of

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A New Method of Identifying γ-Radiations in   S/056/60/03'/004/043/048
the Reactions $(p,p'\gamma)$, (p,γ), and $(p,n\gamma)$ B006/B056

the reactions $(p,p'\gamma)$ and (p,γ) of the isotope in a large proton-energy range above the (p,n) threshold, thus determining the level excitation thresholds; hereafter, the threshold of the occurrence of gamma radiation from the $(p,n\gamma)$ reaction is determined - both must coincide if the gamma radiation investigated actually originates from the $(p,n\gamma)$ reaction, and corresponds to a transition from the investigated level to the ground state. In this method, the accuracy of level-energy determination is independent of the target thickness. As an example for a successful application of this method, the results obtained by investigating the reactions $Co^{59}(p,n)Ni^{59}$ and $Cu^{65}(p,n)Zn^{65}$ are given and discussed. A figure shows the excitation functions of some 465- and 1330-kev and 770- and 1015-kev lines, respectively. The target thicknesses were 1μ and 5μ, respectively. A number of numerical results are given. There are 1 figure and 2 references: 1 Soviet and 1 US.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
             (Institute of Physics and Technology of the Academy of
             Sciences Ukrainskaya SSR)

SUBMITTED: July 18, 1960

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24.6520
24.6910

21(8)

6866
S/020/60/130/05/015/061

AUTHORS: Rutkevich, N. Ya., Golovnya, V. Ya.,B013/B014
              Val'ter, A. K., Academician of the AS UkrSSR, Klyucharev, A. P.

TITLE: Angular Distribution of 5.45-Mev Protons Scattered Elastically
              by Nickel-, Copper-, and Cobalt Isotopes

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 5, pp 1008-1011
              (USSR)

ABSTRACT: The present paper describes the determination of this angular
              distribution with initial proton energies of 5.45 Mev, which
              is below the potential threshold of the target nuclei by about
              1.5 Mev. The protons accelerated to 5.45 Mev by a linac travel
              through a magnetic analyzer with a deflection of 24°, a system
              of collimating diaphragms, and incide upon a target made of a
              thin foil, which had been put in a vacuum chamber. The scat-
              tered protons were then recorded by photographic plates which
              were arranged at angles of from 20° to 160° with respect to the
              incident beam. Nuclear emulsions of the type K NIKFI with a
              layer thickness of 100 μ were used. Figure 1 illustrates the
              geometrical arrangement of the experiment. Table 1 gives the

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Angular Distribution of 5.45-Mev Protons   S/020/60/130/05/015/061
Scattered Elastically by Nickel-, Copper-,   B013/B014
and Cobalt Isotopes

composition and thickness of the metallic foils which served
as targets. The electron flux was measured by means of a
beam catcher with a current integrator. Figure 2 shows the
energy distribution of protons scattered by Ni^{62} at 140°. The
group of elastically scattered protons can be separated reliably
from the nonelastically scattered protons. The half-width of
the maximum corresponding to the elastically scattered protons
is $\pm$ 100 kev. The non-monochromaticity of the primary protons
is thus $\pm$ 100 kev at most. The first energy level is above
1 Mev for all even-even nickel isotopes. Co^{59} has its first
level at 1.1 Mev and Cu^{65} at 0.77 Mev. The energy spectra of
protons scattered by these nuclei indicated the existence of
isolated elastic groups. In all cases, the elastically scatter-
ed protons could be separated reliably from the total spectrum.
Figure 3A shows the angular distribution of protons elastical-
ly scattered by cobalt and the isotopes of nickel and copper.

Card 2/4   Measurements made by various methods (scintillation crystal

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S/020/60/130/05/015/C61
B013/B014

Angular Distribution of 5.45-Mev Protons
Scattered Elastically by Nickel-, Copper-,
and Cobalt Isotopes

with photomultiplier, photographic camera) yield consistent
results. Figure 3B illustrates the angular distribution for
a summation of the experimental data, for the three nickel
isotopes under consideration, and for naturally-occurring
nickel. Figure 4 shows the angular distribution of protons
elastically scattered by the nuclei Ni^{58}, Ni^{60}, and Ni^{62}. The
height of the maximum and the depth of the minimum are dif-
ferent, and the position of the minimum is markedly shifted
toward smaller angles with increasing mass number of the
scatterer. The angular distribution of protons scattered by
copper and cobalt is qualitatively equal, but at large angles
it differs noticeably from the scattering by nickel isotopes.
The angular distribution of protons elastically scattered by
Cu^{63} is qualitatively similar to that for Cu^{65}. The addition
of two neutrons to the nucleus changes scattering as a func-
tion of the angle only to a small extent. This is also indicat-
ed by results obtained by the authors for nickel, which are,
however, insufficient for general conclusions. It is therefore

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Angular Distribution of 5.45-Mev Protons
Scattered Elastically by Nickel-, Copper-,
and Cobalt Isotopes

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B013/B014

necessary to carry out further experiments on elastic scatter-
ing by various nuclei. There are 4 figures, 1 table, and
10 references, 4 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR
(Institute of Physics and Technology of the Academy of
Sciences of the UkrSSR)

SUBMITTED: August 13, 1959

Card 4/4

S/120/61/000/001/004/062
E032/E114

AUTHORS: Val'ter, A.K., Klyucharev, A.P., and Skakun, N.A.

TITLE: Proton Polarimeters with Reduced Sensitivity to
             Neutron and Gamma Backgrounds

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.1, pp.20-22

TEXT: A description is given of two devices for measuring
the polarization of protons at low and intermediate energies.
Fig.1 shows a helium polarimeter used by the present authors.
Protons whose polarization is to be measured enter from the left
through the collimator 2.   At the input to the collimator there
is a thin aluminium foil 1 which separates the reaction chamber
from the helium analyzer. After being scattered in the working
volume of the polarimeter, the protons enter the proportional
counter 11 through the Venetian blind collimator 4 which was
first used by P.V. Sorokin (Ref.1). Slats of the latter
collimator are made of copper foils 1 mm thick and set at an
angle of 65° to the axis of the polarimeter. The width of this
collimator is 20 mm and the distance between the slats is 6 mm.
This design leads to an effective increase in the thickness of the
Card 1/4

S/120/61/000/001/004/062
E032/E114

Proton Polarimeters With Reduced Sensitivity to Neutron and Gamma
Backgrounds

gas target and, consequently, in the number of counts. A further
increase in the latter number is obtained by increasing the
pressure of the helium gas to 10 atm. After passing through the
proportional counter the protons enter the caesium iodide crystal
(10 in Fig.1) (104 x 35 x 1.5 mm^3) which is in the form of a
mosaic made up of separate plates. The light guide 9 is made of
perspex and the photomultiplier 8 is at an angle of 30° to the
polarimeter axis. Pulses due to a given proton which are recorded
by the proportional counter and the photomultiplier are fed into a
coincidence circuit. In this way neutron and gamma ray backgrounds
are practically excluded. The central photomultiplier 7 &?/-29
(FEU-29) is used to measure the energy of the protons entering the
polarimeter and can also be used as a proton monitor. The
absolute counting efficiency of the polarimeter for 18 MeV protons
is about 10^{-5}. A major advantage of this type of polarimeter is
the continuous recording of particles recorded to the left and to
the right of the polarimeter axis. The second type of

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S/120/61/000/001/004/062
E032/E114

Proton Polarimeters With Reduced Sensitivity to Neutron and Gamma Backgrounds

polarimeter is shown in Fig.3.   In this polarimeter the protons are scattered at 45° at a solid carbon target 4 and enter a cylindrical proportional counter 8 and then the caesium iodide crystal 7.   The latter crystal is in the form of a disc (32 mm diameter, 2 mm thick). The working gas in the proportional counters is argon.   Pulses from the proportional and scintillation counters are fed into a coincidence circuit which again excludes neutron and gamma backgrounds. Whereas in the helium polarimeter the polarization due to the analyzer can be calculated (J.L. Gammel and R.M. Thaler, Ref.3), in the case of the carbon target a calibration is necessary. This is the major disadvantage of this instrument. However, the carbon polarimeter has a much better energy resolution and the polarization in p-C^{12} elastic scattering has a large value at 45°, in wide energy interval. The polarimeters have been built for use in experiments on the He^3 (d, p) He^4 reaction.
There are 3 figures and 5 references: 2 Soviet and 3 non-Soviet.

Card 3/6
3   Physics Tech. Inst. AS USSR UKr SSR

VAL'TER, A.K.; ZALYUBOVSKIY, I.I. [Zaliubovs'kyi, I.I.];
    KLYUCHAREV, V.A. [Kliuchariov, V.O.]; LUTSIK, V.A. [Lutsyk, V.P.]

Study of gamma-transitions in the $Co^{59}(p,n\gamma)Ni^{59}$. Ukr.
fiz. zhur. 6 no.3:318-332 My-Je '61.   (MIRA 14:8)

1. Fiziko-tekhnicheskiy institut AN USSR i Khar'kovskiy
gosudarstvennyv universitet im. Gor'kogo.
                (Cobalt—Isotopes)
                (Niobium—Isotopes)
                (Nuclear reactions)

VAL'TER, A.K.; VATSET, P.I.; KOLESNIKOV, L.Ya.; TONAPETYAN, S.G.
[Tonapetian, S.H.]; CHERNYAVSKIY, K.K. [Cherniavs'kyi, K.K.];
SHPETNYY, A.I. [Sgpetnyi, O.I.]

Neutron yield in the reaction $Be^9(t, n)$. Ukr. fiz. zhur. 6
no.4:457-460 Jl-Ag '61.   (MIRA 14:9)

1. Fiziko-tekhnicheskiy institut AN USSR, g. Khar'kov.
          (Nuclear reactions)   (Neutrons—Emission)

VAL'TER, A.K.; VATSET, P.I.; KOLESNIKOV, L.Ya.; TONAPETYAN, S.G.; CHERNYAVSKIY, K.K.; SHPETNYY, A.I.

Neutron yield from Li^6 (t, n) and Li^7 (t, n) reactions. Atom.energ. 10 no.6:577-586 Je '61.   (MIRA 14:6)
     (Neutrons) (Lithium—Isotopes) (Nuclear reactions)

S/048/61/025/002/011/016
B117/B212

AUTHORS: Antuf'yev, Yu. P., Val'ter, A. K., Gonchar, V. Yu.,
                Kopanets, Ye. G., L'vov, A. N., and Tsytko, S. P.

TITLE: Radiative proton capture by the S^{34} isotope

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25,
                no. 2, 1961, 265-269

TEXT: The present paper was read at the 11th Annual Conference on Nuclear
Spectroscopy (Riga, January 25 to February 2, 1961). The authors have in-
vestigated the radiative proton capture by S^{34} at a 1214-kev resonance ener-
gy. The gamma spectra were analyzed by means of a single-crystal spectro-
meter, a coincidence spectrometer, and a summation spectrometer. Based on
the values obtained, the authors state that the transition of the 7.5-Mev
resonance level proceeds only cascade-like over an intermediate level. The
energies of the gamma rays in the cascade are 3.17 and 4.38 Mev. A direct
transition to the ground state may have a relative intensity of less than
0.5%. The angular distribution of gamma rays was measured for rays with
4.38 Mev and 3.17 Mev at an angular interval of 0-150 degrees on both sides

Card 1/3

Radiative proton capture ...

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B117/B212

of the proton beam. Test data and calculated data were intercompared.
They were in best agreement when the spins of the resonance- and intermedi-
ate levels were equal to 7/2. The value of the gamma-gamma correlation,
measured with the summation spectrometer, corresponds (within the limit of
error) to the calculated value, which fact confirms a spin of 7/2. An ana-
lysis of the relative transition probability from the resonance level to the
ground state and the intermediate state with a spin of $3/2^+$ and $7/2^{\pm}$, respec-
tively, leads to the conclusion that the parity of the resonance and inter-
mediate levels must be negative, and that the transition from the resonance
level to the ground state must be -M2. The presence of one more level with
the spin $7/2^-$ near 7.55 Mev, which corresponds to a resonance level, cannot
be explained by single-body excitation on a shell- or generalized model. It
may be assumed therefore that this level corresponds to a two-body excita-
tion. A comparison of the values obtained experimentally for the width of
the resonance level with those calculated according to a single-body model
confirmed this assumption. The authors determined the absolute yield of
gamma rays from a thick S^{34} target and found it to be $2.56 \cdot 10^{-9} \pm 15\%$ per
each proton decay. The authors thank M. I. Guseva for preparing the iso-
topic targets, A. A. Tsygikalo, Yu. A. Kharchenko, and the personnel of the

Card 2/3

Radiative proton capture ...

8/048/61/025/002/011/016
B117/B212

electrostatic generator for the smooth operation of the latter. There are
5 figures and 5 references: 4 Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Institute of
Physics and Technology of the Academy of Sciences UkrSSR)

Card 3/3

VAL'TER, A.K.; TSYTKO, S.P.; ANTUF'YEV, Yu.P.; KOPANETS, Ye.G.;
L'VOV, A.N.

Studying the levels of P^{31} by the aid of the $Si^{30}(p,)P^{31}$
reaction. Izv. AN SSSR. Ser. fiz. 25 no.7:854-861 Jl '61.

(MIRA 14:7)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Phosphorus—Isotopes) (Silicon—Isotopes)
(Nuclear reactions)

VAL'TER, A.K.; ZALYUBOVSKIY, I.I.; KLYUCHAREV, A.P.; LUTSIK, V.A.

Cu^{64} levels excited in the reaction $Ni^{64}(p, n\gamma) Cu^{64}$.
Izv. AN SSSR. Ser. fiz. 25 no.9:1127-1130 '61.

(MIRA 14:8)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Niobium—Isotopes)
(Copper—Isotopes)
(Nuclear reactions)

VAL'TER, A.K.; VATSET, P.I.; KOLESNIKOV, L.Ya.; TONAPETYAN, S.G.;
CHERNYAVSKIY, K,K.; SHPETNYY, A.I.

Neutron yield in the reaction of tritions with fluorine and
aluminum nuclei. Zhur. eksp. i teor. fiz. 40 no.5:1237-1243
My '61.   (MIRA 14:7)

1. Fiziko-tekhnicheskiy institut AN Ukrainskoy SSR.
(Nuclear reactions) (Tritons(Tritium ions)) (Neutrons—Measurement)

VAL'TER, A.K.; ZALYUBOVSKIY, I.I.; KLYUCHAREV, A.P.; LUTSIK, V.A.; ORLENKO,
B.F.; PASECHNIK, M.V.; PROKOPENKO, V.S.; PUCHEROV, N.N.

Angular distribution of 6.8 mev. protons elastically scattered on
nickel and zirconium isotopes. Zhur.eksp.i teor.fiz. 41 no.1:71-
74 Jl '61.   (MIRA 14:7)

1. Institut fiziki AN Ukrainskoy SSR i Fiziko-tekhnicheskiy institut
AN Ukrainskoy SSR.
   (Protons--Scattering) (Nickel--Isotopes) (Zirconium--Isotopes)

VAL'TER, A.K.; ANTUF'YEV, Yu.P.; KOPANETS, Ye.G.; L'VOV, A.N.;
TSYTKO, S.P.

Quantum characteristics of the 6.847 Me. level of P^{30} observed
in the reaction Si^{29} $(p,\gamma)P^{30}$. Zhur. eksp. i teor. fiz. 41
no.5:1449-1453 N '61.   (MIRA 14:12)

1. Fiziko-tekhnicheskiy institut AN Ukrainskoy SSR.
                    (Nuclear reactions) (Phosphorus)
                          (Silicon—Isotopes)

VAL'TER, Anton Karlovich; PLAKSIN, Igor' Nikolayevich; GOL'DIN, Mikhail
L'vovich; SAVITSKIY, P.S., inzh., otv. red.; FURILOVA, T.M., red.;
TROFIMENKO, A.S., tekhn. red.

[Automatic density control of iron-ore flotation pulps with the
help of gamma rays] Avtomaticheskii kontrol' plotnosti zhelezo-
rudnoi pul'py gamma-luchami. Khar'kov, Izd-vo Khar'kovskogo
univ., 1962. 243 p.   (MIRA 16:6)
    (Flotation) (Gamma rays--Industrial applications)

S/903/62/000/000/017/044
B102/B234

AUTHORS: Val'ter, A. K., Vanetsian, A. A., Klyucharev, A. P.,
             Timoshevskiy, G. E., Fedchenko, Ye. D.

TITLE: Calculation of the differential elastic scattering cross
             sections of 6.8-Mev protons for nuclei of some Ni, Cu, and Cr
             isotopes on the basis of the optical model of the nucleus

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy
             Vtoroy Vsesoyuznoy konferentsii, iyul' 1960. g. Ed. by
             .... Izd-vo AN SSSR, ...

Text: .... parameters and in the
.... scattering in the .... these parameters in the
case of agreement with experiment, optical-model calculations were carried
out for $Cr^{53,58}$, $Ni^{60,62}$, and $Cu^{63,65}$ for $E_p = 5.45$, 6.8 and 19.6 Mev, which
gives the possibility of obtaining the energy dependence of the parameters.
.... energiya, 6, 561,
.... Trudy, 19, ..., 1960. .... The calculations

Card 1/3

are made in the usual manner with the potential ansatz

$$V^{\pm'}(r) = V_{xyz}(r) + V_0 \frac{1}{1 + e^{\frac{\rho - \rho_{00}}{ka}}} + iW_0 e^{-\left(\frac{\rho - r_0}{kb}\right)^2} - \chi \left(\frac{\hbar}{\mu c}\right)^2 \frac{1}{r} \frac{df}{dr} V_{so}(sl). \quad (8)$$

$$(sl) = \begin{cases} l & \text{для } j = l + \frac{1}{2}, \\ -(l+1) & \text{для } j = l - \frac{1}{2}, \\ 0 & \text{для } l = 0. \end{cases}$$

where $V_{xyz}(r)$ is the Coulomb potential.   Agreement was best when the follow-ing parameters were used:

	r_0	a	b	V_0	W_0	V_{so}
Cr⁶³	1,23	0,38	0,80	64,7	7,6	92
Ni⁵⁸	1,23	0,36	0,73	66,3	6,6	94
Ni⁶³	1,23	0,37	0,74	66,0	6,5	93
Ni⁶¹	1,23	0,46	0,34	64,0	5,6	53
⁶³						
Cu⁶⁵	1,23	0,43	0,85	64,2	5,1	60

Card 2/3

Calculation of the differential...

S/9../3/62/000/000/017/044
B1(2/B234

Conclusions: The position of the extrema in the $\sigma(\theta)$ curve is mainly deter-
mined by the two parameters V_o and r_o which are interrelated by $V_o r_o^2$=const.
Any change of these parameters affects not only the position but also the
amplitude of the extremum. When V_o and r_o are increased the extremum
becomes shifted to smaller angles ∂. A variation of a corresponds to rota-
tion of the angular distribution around θ=0°; increasing of a means rotation
in the negative sense. Reduction of b shifts the extrema toward larger θ
and raises their amplitude, particularly at large θ. W influences only the
height of the extrema. Any alteration of the spin-orbital potential V_s
causes a distortion of the angular distribution especially for $\theta \geq 120°C$.
There are 11 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical
            Institute AS UkrSSR)

Card 3/3

S/185/62/007/004/008/018
D407/D301

AUTHORS: Skakun, M. O., Val'ter, A. K., and
               Klyucharyev, O. P

TITLE: Proton polarization in $D(d,p)H^3$-reaction

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 4,
               1962, 383-385

TEXT: Proton polarization in the $D(d,p)H^3$-reaction was
determined by measuring the asymmetry of elastically scattered
protons by helium. The protons were recorded by means of a
telescope incorporating a proportional counter and a photo-
multiplier. In the present work, a method is used whereby the
background is considerably reduced. This method involves appli-
cation of a paraffin coating 25 cm thick. The experimental pro-
cedure is described. The degree of polarization P_1 for par-
ticles with spin 1/2 was determined by measuring the azimuthal
asymmetry R of elastically scattered protons, by means of the

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S/185/62/007/004/008/018
D407/D301

Proton polarization in...

formula

$$R = \frac{1 + P_1 P_{an}}{1 - P_1 P_{an}},$$

where P_{an} is determined by the geometry of the analyzer. The angle of elastic scattering was 90°, and $P_{an} = 0.39$. The results of the measurements are listed in a table. With energies of 0.72, 1.10, and 1.48 Mev, the degree of polarization was found to be $-17 \pm 8\%$, $-18 \pm 9\%$, and $-15 \pm 9\%$ respectively. A comparison with the results of other investigators showed good agreement. There are 1 figure, 2 tables and 11 references: 3 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: McCormac, Steuer and Hereford, Phys. Rev., 104, 718, 1956; B. Maglic, Nuclear Physics, 6, 449, 1958; R. Segel and S. Hanna, Phys. Rev.,

Card 2/3

Proton polarization in...   S/185/62/007/004/008/018
D407/D301

106, 536, 1957; W. Dachnick, Phys. Rev., 115, 1008, 1959.

ASSOCIATIONS: Fizyko-tekhnichnyy instytut AN URSR (Physico-
technical Institute of the AS UkrRSR);
Kharkovs'kyy derzhuniversytet im. A. M. Gor'kogo
(Kharkiv State University im. A. M. Gor'kiy)

SUBMITTED: September 23, 1961

Card 3/3

40104

S/048/62/026/008/020/028
B104/B102

24.6600

AUTHORS: Val'ter, A. K., Gonchar, V. Yu., Zalyubovskiy, I. I., Latyshev, G. D., and Chursin, G. P.

TITLE: Study of the (np) and (n,np) reactions on heavy nickel isotopes

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 8, 1962, 1079-1084

TEXT: The object of this study was to find possibilities for further investigations of spectra and angular distributions of the products of (np) and (n,np) reactions on nickel, and to check the rules governing the reaction cross sections as found by V. N. Levkovskiy (ZhETF, 31, 360, 1956; 33, 1520, 1957). A tritium target (T being adsorbed to zirconium) was bombarded by 100-kev deuterons and sufficiently fast neutrons were produced in the $T(d,n)He^3$ reaction. A recoil proton telescope was used as neutron monitor and the β-activity induced was measured with a scintillation counter. The half-lives were determined by a multi-channel analyzer. The reaction cross sections obtained (Table) agree with pub-

Card 1/2

Study of the (np) and (n,np) ...   S/048/62/026/008/020/028
B104/B102

lished data within the limits of error. The rule found by Levkovskiy for
the (np) reaction cross sections of various isotopes of an element applies
very well to Ni. There are 5 figures and 1 table.

ASSOCIATION: Khar'kovskiy gos. universitet im. A. M. Gor'kogo (Khar'kov
                State University imeni A. M. Gor'kiy). Institut yadernoy
                fiziki Akademii nauk KazSSR (Institute of Nuclear Physics
                of the Academy of Sciences KazSSR)

Table. Cross sections. Legend: (1) reaction, (2) half-life, (3) Q, Mev,
(4) σ, millibarn.

(1) reaction	(2) half-life	(3) Q, Mev	(4) σ, millibarn
Ni^{61}(np) Co^{61}	104±2	—0,65	86±3
Ni^{62}(np) Co^{62}	13,9±0,2	—3,14	22±1
Ni^{63}(np) Co^{63*}	1,5±0,1	—	34±2
Ni^{64}(np) Co^{64}	9,3±0,9	—5,08	5±1
Ni^{64}(np) Co^{64*}	2±0,2	—	2±1
Ni^{62}(n, np) Co^{61}	104±2	—9,70	4±1,5
Ni^{64}(n, np) Co^{63}	122±5	—10,86	6±1,5

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S/048/62/026/009/003/011
B125/B186

AUTHORS: Val'ter, A. K., Antuf'yev, Yu. P., Kopanets, Ye. G., L'vov, A. I., and Tsytko, S. P.

TITLE: Decay scheme of the 8.92-Mev state and quantum characteristics of the lower levels of the K^{41} nucleus

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 9, 1962, 1137-1142

TEXT: In continuation of an earlier paper by A. K. Val'ter et al. (Izv. AN SSSR, Ser. fiz., 24, no. 7, 891 (1960) on the reaction $Ar^{40}(p')$ the 1107.5 kev resonance is studied. The proton beam from the electrostatic generator of the FTI AN USSR was made to strike the target through a collimating system. Ar^{40} ions were "knocked" into the tantalum backing of such targets. Fig. 1 shows the hard part of the spectrum taken by a γ-spectrometer with an NaI(Tl) crystal. The peaks R, A, B, C, and D of the soft part are at 0.5; 0.6; 1.0; 1.3, and 1.6 Mev. The spectrum of Fig. 3 was taken by a coincidence spectrometer with two crystals. The

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Decay scheme of the 8.92-Mev ...

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lines A, B, C, D coincide with the hard part of the spectrum. The
anisotropy $A = (W(90^\circ)-W(0^\circ))/W(90^\circ)$ of the angular distribution of the
γ-rays at 7.9; 7.3; 6.3; 1.6 and 1.0 Mev is 0.48; -0.54; +0.14 and +0.05,
respectively. There is no transition between the 8.92-Mev resonance
level and the ground state. Most of the transitions coming from the
resonance level have the same probability. The 2.6-Mev state passes
to the ground state rather indirectly over the 1.0-Mev level or over the
1.6-Mev level. The line intensity ratio $I_D/I_A \simeq 1$ remains almost constant
from $E_\gamma = 6.0$ to $E_\gamma = 6.8$. Then it decreases rapidly to ~ 0.22 with
$E_\gamma \sim 6.8$ and ~ 0.18 with $E_\gamma \sim 7.6$ Mev. The levels with 1.0 and 1.3; 1.6 and
2.6 Mev are formed according to the scheme of Nillson S. P., Danske
Mat. fys. medd., 29, No 16 (1955) by single-particle excitation when an
unpaired proton passes onto states with $1/2^-$, $7/2^-$, $3/2^-$ and $5/2^-$.
The 8.92-Mev resonance level occurs when a proton in the state $g_{9/2}$ with
$\Omega = 3/2^+$ is captured. For the levels 1.0; 1.6; 6 and 8.82 Mev the spins
and parities $1/2^-$, $3/2^-$, $5/2^-$, and $3/2^-$ are the most probable. These
values are also compatible with the shell model having a strong jj-coupling.
There are 6 figures and 2 tables.
Card 2/6

Decay scheme of the 8.92-Mev ...   S/048/62/026/009/003/011
                                                B125/B186

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR
              (Physicotechnical Institute of the Academy of Sciences
              UkrSSR)

Fig. 1. γ-ray spectrum studied with a "single-crystal" spectrometer
(hard part).

Fig. 3. γ-ray spectrum studied with the aid of a "summing" spectrometer.
Fig. 5. Scheme of the levels of the K^{41} nucleus
Table 2. Possible values of the level spins.

Card 3/6

Decay scheme of the 8.92-Mev ...

S/048/62/026/009/003/011
B125/B186
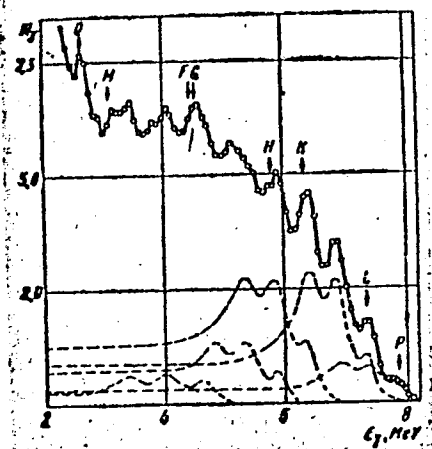
Fig. 1

Fig.3
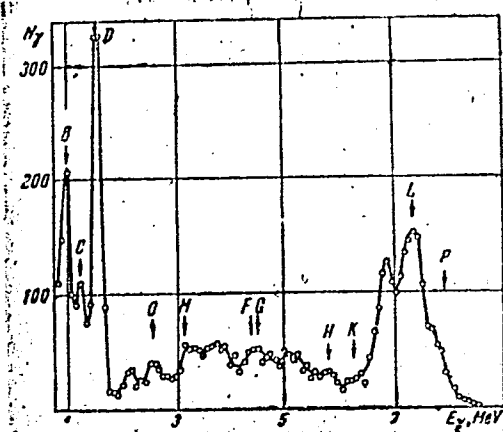
Card 4/6

Decay scheme of the 8.92-Mev ...

S/048/62/026/009/003/011
B125/B186
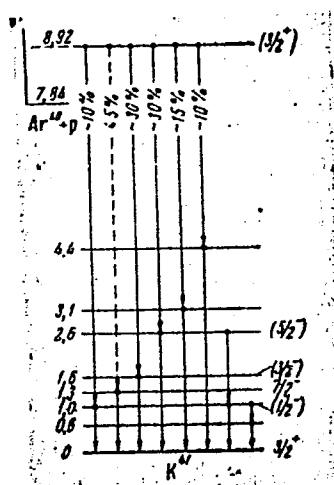
Fig. 5

Card 5/6

Decay scheme of the 8.92-Mev ...

Table 2

E, MeV	$I_{pcs} = \%$						E, MeV	$I_{pcn} = \%$				
	I			$\delta^2 = \frac{I_{L=2}}{I_{L=1}}$				I			$\delta^2 = \frac{I_{L=2}}{I_{L=1}}$	
1,0	$1/2$	—	$5/2$	0,03	—	0	1,0	$5/2$	—	$7/2$	0,04	—	0
1,6	—	$5/2$	—	—	0,01	—	1,6	—	—	$7/2$	—	—	—
2,0	$1/2$	—	$5/2$	0	—	0,09	2,0	$5/2$	$5/2$	$7/2$	0	0,03	0,1 0,03

Card 6/6

S/056/62/042/002/013/055
B102/B138

AUTHORS: Antuf'yev, Yu. P., Val'ter, A. K., L'vov, A. N., Kopanets, Ye. G., Tsytko, S. P.

TITLE: Investigation of the resonances in the reaction $Si^{29}(p,\gamma)P^{30}$

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 2, 1962, 386-391

TEXT: The relative gamma quantum yield of the reaction $Si^{29}(p,\gamma)P^{30}$ was measured in the range $1.3 \leqslant E_p \leqslant 1.55$ Mev. Of the five resonances detected, those at E_p = 1375 and 1500 kev were studied in detail; the others were at 1308, 1330, and 1470 kev. For the 1375-kev resonance, related to the 6.892-Mev level of the P^{30} nucleus and the 1500-kev resonance (7.014-Mev level), the spectra and the gamma-quantum angular distributions were determined. The parameters of the gamma lines of these spectra were determined numerically and the decay schemes (Figs. 5, 6) are given. For the most intense line (6.20 Mev) of the 1375-kev resonance spectrum the angular asymmetry of the angular distribution $W = 1 + A\cos^2\psi$ (dipole

Card 1/3

Investigation of the resonances ...
S/056/62/042/002/013/055
B102/B138

γ-transition) was measured as $A = [W(0^\circ) - W(90^\circ)]/W(90^\circ) = -0.63 \pm 0.05$. The corresponding value, $A = 1.07 \pm 0.10$ was measured for the most intense gamma line (2.83 kev) of the 1500-kev resonance spectrum. The values of the level parameters J^π and T are discussed. There are 6 figures, 3 tables, and 5 references: 3 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: P. M. Endt et al. Phys. Rev. 95, 580, 1954; C. Van der Leun, P. M. Endt. Phys. Rev. 110, 89, 1958.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
               (Physicotechnical Institute of the Academy of Sciences
               Ukrainskaya SSR)

SUBMITTED: August 17, 1961

Figs. 5 and 6. Decay schemes and gamma transitions from the resonance levels 6.892 and 7.014 kev, respectively.

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44225

S/056/62/043/006/012/067
B102/B104

24,6600

AUTHORS: Val'ter, A. K., Popov, A. I., Storizhko, V. Ye.

TITLE: Elastic scattering of protons from Si^{30} nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
no. 6(12), 1962, 2038 - 2041

TEXT: The differential elastic proton scattering cross-sections $\sigma(\theta)$ were measured at the c.m. angles $\theta = 90$, 125, and 141 and at $1 \leqslant E_p \leqslant 3.65$ Mev. The monochromatic ($\pm 0.05\%$) protons used in the experiments were obtained from the electrostatic accelerator of the FTI AN USSR. The scattered protons were analyzed by a magnetic spectrometer and detected with a thin $CsI(Tl)$ crystal. The proton current was determined with a beam-catcher and a current integrator. The thin Si^{30} target was prepared in a magnetic separator by introducing Si^{30} ions into spectrally pure graphite. In the energy range investigated, the $\sigma(E_p)$ curves showed 52 resonances that can be related to excited states of the P^{31} nucleus. The most pronounced

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resonances are analyzed in the single-level approximation of dispersion theory. Results: The excited 8.751-Mev level of P^{31} that corresponds to the resonance at E_p = 1514 kev most probably has the characteristics $1 = 0$, $J = 1/2^+$. The resonance at E_p = 3202 kev corresponds to the 10.385 Mev level with $1 = 2$ and most probably $J = 5/2^+$. The resonance at E_p = 3308 kev corresponds to the 10.487 Mev level with the characteristics $1/2^+$. This resonance is due to a proton capture in the S-state. The resonance at E_p = 3438 kev corresponds to the 10.614 Mev level with $1 = 2$ and $J = 3/2^+$. The cross-sections of the $Si^{30}(p,p)Si^{30}$ reactions decrease with increasing E_p; this decrease is most pronounced at $\theta = 90^\circ$ and least at 141°. There are 4 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
              (Physicotechnical Institute of the Academy of Sciences
              Ukrainskaya SSR); Khar'kovskiy gosudarstvennyy universitet
              (Khar'kov State University)

SUBMITTED: July 11, 1962
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S/020/62/147/006/012/034
B104/B160

AUTHORS: Val'ter, A. K., Academician AS UkrSSR, Klyucharev, A. P.,
Lutsik, V. A., Orlenko, B. F., Pasechnik, M. V., Academician
AS UkrSSR, Prokopenko, V. S., Pucherov, N. N.

TITLE: The elastic scattering of 6.9 Mev protons by chromium and
zinc isotopes

TEXT: A method described by A. K. Val'ter et al. (ZhETF, 38, 1419
(1960)) was used to investigate the elastic scattering of (6.9 ± 0.07)
Mev protons by Cr^{50}, Cr^{54}, Cr^{52}, Cr^{53}, Zn^{64}, Zn^{68}, Zn^{70}. Between 20 and
160°, the angular distribution of the elastically scattered protons was
determined in the form of the angular dependence of $\sigma_{exp}/\sigma_{Rutherford}$
every 5°. For chromium the results obtained (Fig. 1) show that the
(p,n) reaction definitely makes a partial contribution to the proton
scattering by Cr^{52} (reaction threshold 5.63 Mev) and a strong contribution
when the protons are scattered by Cr^{53} and Cr^{54} ((p,n) reaction thresholds

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5.45 Mev). The (p,n) reaction threshold of the zinc isotopes is 8 Mev, but the angular distributions of the proton scattering are similar to those in heavy chromium isotopes. This abnormal angular distribution might be solved by investigating the system $Zn^{64} + p$ in a wide energy range and studying the elastic scattering and possible nuclear reactions. There are 1 figure and 1 table.

ASSOCIATION: Institut fiziki Akademii nauk USSR (Institute of Physics of the Academy of Sciences UkrSSR); Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physicotechnical Institute of the Academy of Sciences UkrSSR)

SUBMITTED: June 21, 1962

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B104/B180

Fig. 1
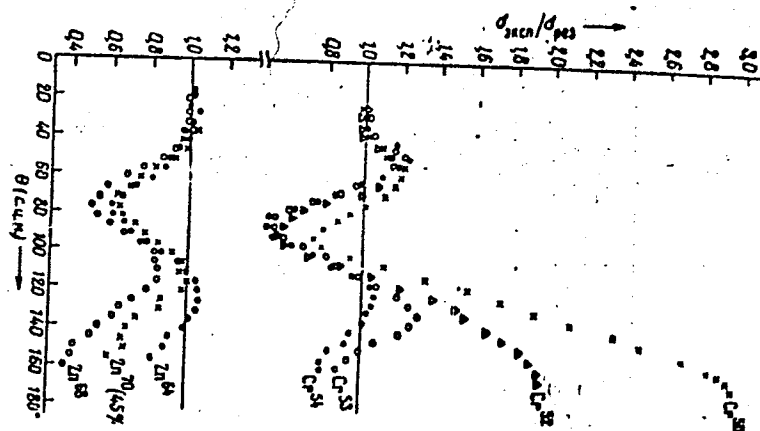
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PHASE I BOOK EXPLOITATION

SOV/6536

Val'ter, A. K., F. G. Zheleznikov, I. F. Malyshev, G. Ya. Roshal',
A. N. Serbinov, A. A. Tsygikalo, and S. P. Tsytko

Elektrostaticheskiye uskoriteli zaryazhennykh chastits (Electrostatic
Accelerators of Charged Particles) Moscow, Gosatomizdat, 1963.
301 p. 4700 copies printed.

Ed. (Title page): A. K. Val'ter, Academician, Academy of Sciences of
the UkrSSR.

Ed.: A. V. Gorokhovskiy; Tech. Ed.: N. A. Vlasova.

PURPOSE: This book is intended for scientists, students, engineers,
and technicians developing, utilizing, or studying high-potential
engineering and acceleration of charged particles.

COVERAGE: This textbook on electrostatic generators is devoted chiefly
to electrostatic accelerators intended for nuclear research.

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Electrostatic Accelerators (Cont.)

Sections 1—3 of Ch. I are written by A. K. Val'ter; Section 4 of
Ch. I and Chs. II, V, and VII are written by A. A. Tsygikalo;
Ch. III, by A. N. Serbinov; Ch. IV, by S. P. Tsytko; and Ch. VI, by
I. F. Malyshev, F. G. Zheleznikov, and G. Ya. Roshal'. There are
182 references: 73 Soviet and 109 non-Soviet.

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